Transportation Master Plan
For The Greater Texas Medical Center Area

Technical Memorandum 3

GOALS, OBJECTIVES AND GUIDING PRINCIPLES

Prepared for

The City of Houston

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1. INTRODUCTION

The purpose of this memorandum is fivefold: i) to review the transportation systems and associated planning strategies of other major activity centers; ii) to review the relevant transportation-related goals and objectives of the federal, state, metropolitan, local, and transit authorities that have jurisdiction in the study area; iii) to discus the selected transportation-related goals and objectives for the study area; iv) to discuss the selected guiding principles for the transportation master plan; and v) to discuss the selected transportation improvement strategy.

2. TRANSPORTATION SYSTEMS FOR OTHER MAJOR ACTIVITY AREAS

The purpose of this review was to learn from the strategies used in other major activity centers to meet their transportation access and mobility needs. This investigation included two major medical centers and eight midtown and outlying commercial activity centers.

The activity centers included in this review were:

- University of Texas Southwestern Medical Center;
- University of Wisconsin Medical Center;
- Research Triangle Park;
- Las Colinas;
- Hacienda Business Park;
- Irvine Spectrum;
- Bellevue Business District;
- Crystal City;
- Uptown Houston; and
- Warner Center.

The following are some characteristics and concepts identified through interviews with representatives of these areas that might be applicable for the TMC study area:

Coordinated Planning

- Coordinated transportation planning seemed to be an important concept for most of these developments or areas. Some have their own internal management structures that address transportation issues, while others receive extensive city planning and management of their transportation efforts.
- The following management structures are used by the various developments:
  - University of Texas Southwestern Medical Center: university-based management (Physical Plant Department).
  - University of Wisconsin Medical Center: university-based management (Facilities Department).
  - Research Triangle Park: internal Planning and Development Department, also an internal TDM coordinator.
  - Las Colinas: internal management; there is a Community Relations Office.

- Hacienda Business Park: internal Urban Transportation Department.
- Irvine Spectrum: internal Spectrum Transportation Management Association.
- Bellevue business district: relies on the Transportation Planning Department within the city, there is also a TDM coordinator.
- Crystal City: relies on the Planning Division of the Arlington County Public Works Department.
- Uptown Houston: mostly performed by area association, but some performed by MPO and transit authority with association's input.
- Warner Center: internal Warner Center Transportation Management Organization.

Transit

- Transit passes that are good for trains, buses, and perhaps shuttles are used to create a much more seamless transit experience. This also increases transit ridership.
- The University of Wisconsin Medical School is planning to provide transit services free of charge to its employees and students. Some other shuttle services are also provided at no cost to riders.
- Most of the developments have extensive shuttle services to move people between the major facilities within the activity centers and also to and from transit stops. Some of the shuttles are owned and operated by organizations within the activity centers. The shuttles are mostly operated during morning and afternoon peak periods. Warner Center also operates a lunchtime shuttle for their employees to travel to and from a food court.
- Some of the developments have agreements with the local transit agencies to operate transit services into and/or through the developments.
- Las Colinas has an internal people mover connecting much of its high density business area. The people mover operates during normal business hours. No fare is charged. Some other activity centers have reviewed the potential benefits and feasibility of people movers, but none of the activity centers examined currently have committed to construct a people mover.

Parking

- In most cases, the individual developers or building owners provide and operate their own parking. Revenues generated by parking are, therefore, for their own accounts.
- Parking garages and lots are used as the primary supply of parking. On-street parking is used in limited cases for small amounts of parking.
- Very few of the developments within the activity centers examined make use of remote parking. Only Las Colinas and the University of Wisconsin Medical Center have remote parking that is combined with a shuttle service. The remote parking is particularly useful during special events such as a recent tennis tournament at Las Colinas.
- University of Wisconsin Medical Center uses "flex-lots." With this system, people commit to only use a lot part of the time so that the remaining time the lot can be allocated to a different person(s).

Walking/bicycling

- Several of the developments have extensive walking trails. For example, the Research Triangle Park in Raleigh has 15 miles of walking trails.
- Facilities for bicycling are much more limited, except if they can be shared with the pedestrian facilities.
- Hacienda Business Park for example, attempts to be very bicycle and pedestrian friendly. They also have promotion programs for bicycling.

Travel Demand Management

- Most of the developments employ TDM measures.
- The Research Triangle Park in Raleigh has a fulltime position for a TDM coordinator.
- In addition to the normal TDM measures, Hacienda Business Park and Warner Center have installed preferential parking for carpools and vanpools. They also have a guaranteed ride home program.
- Some other centers provide other forms of incentives to employers and employees to make use of carpools and vanpools, such as preferential (and sometimes free) parking for carpools and vanpools.
- There is a commuter store in Crystal City, which gives information to commuters to encourage them to use alternative modes of transportation.
- The reported percentage of commuters using single occupant vehicles are lower in most of these developments (compared with the greater Houston area):
  - Research Triangle Park – 63%;
  - Hacienda Business Park – 70%;
  - Irvine Spectrum Center – 65%;
  - Bellevue – 68%; and
  - Warner Center – 68%.

Transportation Improvement Funding

There are a number of variations among the activity centers for funding transportation improvements beyond the traditional means of using local, state and federal transportation and capital improvement funds. The following is a summary of the most popular programs:

- A Tax Increment Reinvestment Zone (TIRZ) is an economic development tool available to cities under Texas Law. A TIRZ is a specific geographic area defined by the City Council. For the duration of a TIRZ (no more than 30 years), the property taxes from the increased value due to development within the TIRZ is "captured" and placed in a separate fund administered by the City. Only eligible public improvements, such as streets, drainage, utilities, and public facilities, within the zone can receive the captured tax proceeds.
- Special Improvement Districts (SIDs**)** are self-help ventures organized by property owners and local governments to identify and develop defined areas of cities where there is a need for a more successful and profitable business climate. The managing agent for these districts plans for and executes business retention activities, improves security and

maintenance, brings about revitalization and value enhancement, and undertakes marketing and development in downtown areas.

- Special Financing Districts are created for funding transportation improvements. One popular form is the Benefit Assessment District. A tax is levied on these districts based on the benefits received from the transportation improvements. In San Diego, for example, developers can request the city to create a benefit assessment district. These are similar to special improvement districts.
- Another form of special financing district is the County Road District, which is extensively used in Texas. Counties create these districts for the development of major roads. County Road Districts may issue bonds supported through levying property taxes or assessment fees.
- A Transportation Development District establishes a framework for financing transportation improvements through joint public and private support. The legislation activates a number of funding mechanisms for municipalities, including: assessment on business property, notes and bonds, grants, and additional taxes.
- Tax increment financing (TIF) dedicates a portion of a designated area's future tax revenues beyond a certain base amount, for transportation infrastructure. This method is very similar to a Texas TIRZ. Bonds usually accompany this type of financing. The increased tax revenues are earmarked to cover the bond financing. TIF is very effective in areas that are anticipated for growth, since additional revenues are created for tax increments. The proceeds from TIF are generally used for the provision of internal infrastructure.

3. RELEVANT TRANSPORTATION GOALS AND POLICIES

Several agencies at different levels of government have goals, objectives, and policies that guide development or funding of transportation systems. These are of interest for two reasons:

- they provide transportation guidance on achieving compatibility and mutual support of transportation systems, services and improvements; and
- they reflect what may be needed to gain funding support from those agencies.

Below are listed relevant goals, objectives, and policies of federal, state, and local transportation agencies that are either providing transportation facilities or services in the area or can be expected to be a potential source of funding for improvements. Maintaining compatibility with these considerations will increase the probability of obtaining funding for improvements in the study area.

FEDERAL PLANNING CONSIDERATIONS

The current federal transportation funding legislation (Transportation Efficiency Act for the 21st Century – TEA-21) requires several factors to be considered in developing metropolitan area transportation plans. While not directly related to the study area's needs, these considerations do provide insight to federal funding priorities. They are:

- support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- increase the safety and security of the transportation system for motorized and non-motorized users;
- increase the accessibility and mobility options available to people and for freight;
- protect and enhance the environment, promote energy conservation, and improve quality of life;
- enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- promote efficient system management and operation; and
- emphasize the preservation of the existing transportation system.

METROPOLITAN AREA TRANSPORTATION PLAN (MTP) VISION, GOALS, AND OBJECTIVES

Vision

The vision for future transportation in the Houston-Galveston region, as set forth by the Houston-Galveston Area Council (HGAC), the region's transportation planning organization, is contained in the agency's 2022 metropolitan transportation plan:

The Houston-Galveston Region Metropolitan Transportation Plan will enhance mobility by providing an efficient, affordable, safe, and environmentally responsible transportation system for both people and goods.

Goals and Objectives

The region's transportation goals and objectives reflect the thinking of agencies and their elected and appointed leaders and transportation and planning staff. These goals and objectives were developed to serve as milestones in completing the region's transportation vision. The 2022 MTP contains eight goals, each with a number of objectives:

- Increase the number of travel choices for people and freight movement.
    - Evaluate transit options, including urban rail, in all travel corridors where major transportation improvements are being considered.
    - Where feasible, provide transit options to those that cannot or chose not to drive a car.
    - Improve ongoing public education programs on alternatives to driving alone.
    - Develop a system of connected bicycle and pedestrian facilities within each community and throughout the region.
    - Evaluate adding new bicycle and pedestrian facilities in all new roadway construction or major maintenance projects.
- Adequately maintain current roads and transit services.
    - Give priority to maintaining, operating, and managing existing roadways and transit services over expanding these facilities and services.
- Promote coordinated land use and transportation development.
    - Transportation projects should support regional and local land use policies and plans.
    - Transportation projects should promote community and neighborhood cohesion.
    - "Smart growth" and compact land-use development should be encouraged with appropriate transportation investments.
- Improve access to and connections within the transportation system.
    - Provide convenient transfers between connecting methods of travel necessary to complete a trip.

- Design future high-occupancy vehicle (HOV) facilities to provide easy access onto and off the facilities.

- Improve local streets necessary for shorter distance trips.

- Provide efficient movement of people and goods.

  - Consider the needs of freight movements in all aspects of transportation development.

  - Encourage the active involvement of freight shippers in transportation development.

  - Improve street and sidewalk access to transit services and encourages land uses that promote transit ridership.

  - Use new, proven technologies to increase the efficiency of our transportation system.

- Develop an environmentally responsible transportation system.

  - Minimize the negative impacts of transportation projects on the physical and social environment of communities.

  - Include in transportation project budgets sufficient funding to mitigate a project's environmental impacts to an acceptable level.

  - Give priority to programs that reduce vehicle emissions.

  - Provide incentives to encourage the use of alternatives to driving a car alone.

- Develop a cost effective and affordable transportation system.

  - Foster governmental cooperation to avoid duplication and minimize costs.

  - Encourage the joint development and operation of transportation facilities to reduce costs and maximize benefits.

  - Consider life cycle costs and cost/benefit analyses in transportation project selection.

- Provide safe and secure movement of people and commodities.

  - Identify and improve roads for evacuation during emergencies and natural disasters and support emergency management programs.

- Identify and maintain roads and railroads for the transfer of hazardous materials.

- Design and operate transportation facilities and services to be safe and secure for the public.

- Where feasible, provide grade separations on major rail corridors.

- Identify and eliminate safety hazards.

Most of the above regional transportation goals and objectives are applicable, directly or indirectly, to the greater TMC area. If proposed policy, operations, management, and infrastructure improvement to the transportation system and related conditions are consistent with these goals and objectives, the TMC area improvement should be generally compatible with the region's overall transportation program and be supportable for funding.

Metropolitan Transportation Plan (MTP)

There is a long range (approximately 20 year) Metropolitan Transportation Plan for the region that is regularly updated and adopted by HGAC. This plan includes major transportation elements of all modes. Any transportation improvement for which federal or state funding is sought must be compatible with the MTP.

CITY OF HOUSTON

The City of Houston Generally follows the MTP transportation objectives to the extent they are applicable within the City.

Thoroughfare Plan

The City has an official major thoroughfare and freeway plan that is updated and amended annually. All improvements to the major street system within the city boundaries follow that plan. Thoroughfare extensions are either constructed by developers of adjacent land parcels or through the City's capital improvement program (mainly widenings, reconstruction, bridges, completion of gaps). TxDOT or a county may also construct a major arterial street.

HARRIS COUNTY

Harris County generally follows the objectives stated in the region's MTP and the City of Houston thoroughfare plan. Most county transportation investments are made outside municipal boundaries or on roads that are under county jurisdiction within municipal boundaries. The county also improves roads that cross channels under the jurisdiction of the Harris County Flood Control District.

METRO

METRO has an adopted mission statement that is relevant for the study area and its needs:

> METRO is an innovative regional transportation organization…committed to partnering with the public and private sectors to provide the safest, highest quality services and mobility solutions…while creating economic growth.

METRO has a long-range plan consistent with the MTP. Its budgeting and improvement program implement projects and services contained in METRO's long-range plan. METRO service is limited by available funding and regularly reviews services being provided, making adjustments in services to increase productivity as needed.

METRO has a set of transit service standards it employs to evaluate existing and proposed services. Standards and considerations include:

- comparative evaluations/rankings of performance;
- route subsidies;
- cost;
- ridership or projected ridership;
- route variations;
- directness of travel;
- stop spacing;
- stop amenities;
- schedule reliability;
- service frequency;
- passenger load factors; and
- park-and-ride lots and transit centers.

TxDOT

TxDOT's most recent strategy for improving mobility and services in Texas was published as *Texas Transportation Partnership Connecting You To The World* in August, 2001. It contained a variety of goals and objectives; those considered relevant are shown below:

<u>Goals</u>

- Enhance Texas urban and metropolitan area mobility and ensure that congestion is less than in comparable peer U.S. cities.
- Reduce the fatality rate on Texas roadways by five percent within 10 years.
- Ensure that 90 percent of Texas' roads and 80 percent of bridges will be in good or better condition within 10 years.
- Attract and retain businesses and industry with adequate transportation systems and services.

Additional Objectives

- Decrease travel time and costs;
- Increase reliability of travel times;
- Increase transportation alternatives;
- Increase economic opportunities; and
- Enhance Texans' quality of life and the natural environment.

Strategies to achieve goals relevant to the TMC area

Texas Transportation Partnership Connecting You To The World also suggests several strategies that should be employed while developing improved state transportation systems. Those applicable to the study area include:

- consider a range of transportation alternatives as a part of all capacity improvement studies;
- increase transit availability in…urban and metropolitan areas;
- increase the number of transit trips in…urban and metropolitan areas;
- implement Intelligent Transportation System (ITS) technologies to monitor and improve traffic flow (for congested corridors, customs facilities, and truck inspection stations);
- synchronize traffic signals;
- provide alternative modes (pedestrian, bike, bus, and rail choices);
- expand fixed-route transit flexibility and cost effectiveness;
- encourage ride-sharing;
- encourage travel to occur outside of rush hour (telecommuting, compressed workweeks, staggered business hours and congestion pricing to eliminate peak period trips and spread trips over a longer time frame);
- improve arterial streets in urban areas to carry higher volumes of traffic;
- increase lane mileage;
- complete traffic information systems (to help drivers select routes and predict travel times) on all major urban freeways;
- work with all cities and counties and improve traffic signal synchronization;
- improve the average commute time on urban and metropolitan portions of interstate corridors by limiting access ramps; dedicating truck lanes; adding separate carpool, bus and high efficiency vehicle lanes; providing toll roads; and increasing transit use;
- eliminate gaps or bottlenecks in Texas transportation systems;
- encourage master planning to include transportation strategies that support local economic development; and
- during early development of major projects, investigate potential impact on economic vitality.

4. TRANSPORTATION-RELATED GOALS AND OBJECTIVES FOR THE STUDY AREA

Input from stakeholders in the form of issues and desires for the study area and its transportation system were translated into a series of possible goals and objectives. Statements were drafted for consideration of the Technical and Steering Committees. The statements were crafted to reflect overall transportation-related goals for the region and City and to be as consistent as possible with them.

Once a set of draft goal and objective statements had been drafted by the study team and found to be both logical and consistent with stakeholder input, the draft statements were reviewed with the Technical Committee, first at one work session, then after revisions, at a second work session. The draft accepted by the Technical Committee was then reviewed with the Steering Committee at one of its meetings and some further refinements made. The resulting goals and objectives are the result of this process.

AREA TRANSPORTATION GOAL

The underlying goal for the Greater Texas Medical Center area is to:

> Improve transportation system conditions within the study area by providing improved access during both normal and flood conditions, circulation, and parking, that are appropriate to each sub area, through improvements in infrastructure, operations, policies, and practices to reduce the dependency on personal vehicles and effectively utilize available transportation resources.

AREA TRANSPORTATION OBJECTIVES

Objectives that further describe the transportation-related desires and needs of the area are:

- Improve access to trauma centers, major activity areas, and redevelopment areas.
- Improve activity area circulation by all modes of transportation.
- Increase activity center parking in accordance with demand and locate major parking facilities on approach routes.
- Balance the transportation system to reduce dependence on personal motor vehicle travel.
- Protect neighborhood character and conditions and local area cultural, educational, and recreational amenities as transportation services are improved.
- Provide emergency access during flood conditions and develop transportation improvements associated with flood remediation projects.

- Use available transportation resources effectively and efficiently.

These objectives are the base for building the transportation master plan. They are consistent with the transportation objectives of transportation agencies providing facilities and services in the greater Texas Medical Center area.

Guiding principles for the plan, which provide more detailed direction for the master plan, are contained in the next chapter of this memorandum.

5. GUIDING PRINCIPLES FOR THE TRANSPORTATION MASTER PLAN

Goals and objectives establish the direction for the area master transportation plan. However, to further establish guidance for developing the plan and to provide better understanding of what elements the plan should include, a set of guiding principles was developed. The guiding principles describe what elements of the plan should try to accomplish, in much more detail than objectives. In a sense, they provide general attributes of details of the plan and how the plan will support the goals and objectives.

The guiding principles were initially drafted by the study team and provided to the Technical Committee for review and comment. They were developed to support the goals and objectives. They were also drawn for a comprehensive set of transportation principles for major activity centers with characteristics similar to the study area.[1] They were subsequently also provided to the Steering Committee for review. These principles are listed below by category.

GUIDING PRINCIPLES

Accessibility Principles

General accessibility principles

- The street system should provide more than one opportunity to reach a destination.
- Direct activity center traffic away from the core area.
- The street systems should provide adequate access and circulation for expected activity center traffic.
- Direct connections to the activity center by mass transit and high-occupancy vehicles should be considered during the planning stage of major transportation projects to ensure good access by modes other than private automobiles.

Emergency accessibility principles

- Emergency vehicles *must* be able to reach any portion of the activity center in a reasonably direct manner even during flooding conditions.
- Emergency facilities must be easily accessible from all major approach routes with the route(s) leading to emergency entrance(s) clearly marked and free of sharp turns or visibility obstructions.
- Establish principal access points to emergency facilities as far as possible from major intersections and other points of traffic conflict.
- Physically separate emergency access drives from parking facilities, pickup/drop-off areas, truck dock facilities, and any other internal circulation roads used by the public to not conflict with significant pedestrian movements.
- Give emergency vehicles traffic signal priority while serving an emergency.

[1] *Transportation Planning Handbook*, Institute of Transportation Engineers, Washington, DC, 1999, pp.560-597

Circulation Principles

- Improve area circulation for all modes of transportation (vehicular, transit, pedestrian, and bicycle).
- Connect the TMC circulation system with both existing and proposed major thoroughfares beyond the TMC (i.e., freeways and principal arterial streets).
- The TMC circulation pattern should be easily comprehended by the average driver and provide relatively direct routings.
- Avoid complex intersections.
- One-way streets should balance convenience to through trips with inconvenience to local destinations.
- Provide adequate spacing of arterial streets to meet both capacity and circulation needs.
- The street system should have sufficient traffic capacity to minimize congestion and handle peak-hour traffic loads during the planning period.
- Design streets to provide continuous routings and continuity of capacity.
- Physical appearance and characteristics of the street and ROW should be consistent with its intended function to be accommodated or served: These futures include ROW width, driveway width, median width, sidewalk, landscaping, lighting, setbacks, etc.

Parking Principles

- Achieve a balance between parking supply and demand for each development, neighborhood, and/or activity centers, as applicable based on availability of shared parking.
- Parking should provide explicit space for long-term, short-term, and errand parking.
- Do not permit parking on major thoroughfares or collectors.
- Provide adequate off-street facilities to accommodate the needs of regular delivery vehicles, quick-stop service (such as mail and newspaper trucks), and special-purpose vehicles such as construction and maintenance trucks.
- Shuttle transit should connect peripheral commuter parking facilities with activity center destinations.
- Plan parking facilities to be accessible from the primary approach routes and within acceptable walking distance of building entrances or shuttle routes.
- Design and locate street access to major parking facilities to minimize conflicts with pedestrians and not disrupt other on-street traffic movement.
- Design adequate queuing capacity (including valet parking) into each ingress and egress point (queues extending onto streets should be considered unacceptable).

- Clearly identify parking facilities for infrequent users of the facilities.
- Parking facilities should offer security for users and protection of property.
- Encourage shared parking, especially where there are nearby uses whose demands peak at different times of the day, week, or year.

Dependency on Personal Vehicles Principles

Transit principles

- Major activity centers and redevelopment areas within the study area should have access to regional transit.
- METRO Rail will provide north-south high capacity transit service within the study area; other transit modes should provide for robust east-west service to complement METRO's investment in fixed-guide way transit.
- Circulation routes should provide connections within activity centers to high capacity transit and line-haul transit routes.
- Transit routes should intercept employees at peripheral parking facilities at major activity centers to reduce automobile traffic on internal streets.

Pedestrian and bicycle principles

- A pedestrian friendly environment should be established. This should include protection from weather, landscaping and lighting amenities, separation from traffic movements where possible, and separation from bicycle facilities where both pedestrian and bicycle facilities exist.
- Continuous pedestrian pathways (at-grade, below-grade, or above-grade) should link all high intensity activity nodes, including major transit stops and parking facilities.
- To maintain safe and convenient pedestrian crossings, streets should have no more than four moving lanes, unless medians with suitable pedestrian refuges and crosswalks are provided.
- If practical, all streets should have sidewalks on both sides .
- Roadways should accommodate bicycles unless a signed, alternate route is available.
- In areas where high pedestrian volumes are present, separate bicycle and pedestrian paths.
- Bicycle parking and storage facilities should be easy to find, free, and located as close to destinations as possible.

Neighborhood and Local Amenities Principles

- Establish a hierarchy of streets (for example, major arterials, minor arterials, collector and distributor streets, and local streets) that defines the relative importance of moving through traffic and providing access to property. Implement this hierarchy by using street design techniques, traffic control measures, and parking regulations.
- Design streets and land development to complement each other. Arterial streets should border rather than sever land use activity areas.
- Encourage development that supports transit, bicycles, and pedestrians.
- Internal neighborhood streets should accommodate pedestrian, bicycle and transit traffic.
- The neighborhood street system should encourage safe speeds that are compatible with adjacent uses.
- Network street and pedestrian systems within activity centers to facilitate internal movements and avoid circular travel by all modes. Where block lengths exceed 600 feet, provide intermediate connections to adjacent blocks.
- Balance reasonable access and parking needs for Hermann Park institutions with the need to maintain a pleasant and natural park setting.

Flood Remediation Principles

- Design the drainage system of major thoroughfares and storm sewers according to the design guidelines of the city of Houston.
- Through the flood remediation projects, provide transportation facilities that are aesthetically pleasing, assist with emergency access, and create new or improved pedestrian and bicycle facilities.
- Ensure that emergency access to trauma centers is serviceable at all times.

Resource Utilization Principles

- Consider efficient use of existing facilities in addition to physical improvement or construction of new facilities.
- Attempt to improve the operational efficiency before making major capacity improvements.
- Provide services and incentives to increase the use of travel demand management programs to reduce single occupant vehicle use.
- Adopt transportation management plans to provide strategies for parking, transit, and other operations during normal, peak, and special event traffic periods.
- Provide real time guidance to alternative parking in the event of primary parking overflow.

6. STRATEGY FOR TRANSPORTATION IMPROVEMENTS

The forecast travel demand described in Technical Memorandum 2, and the resulting deficiencies, and the goals, objectives, and guiding principles were the basis for developing options for improvement. Most of the options are physical or operational improvements or policies that would directly or indirectly affect travel demand or add service or capacity. All are intended to improve mobility and meet other basic needs related to conducting personal or commercial business, living, and using recreational and cultural resources in the area.

TRANSPORTATION IMPROVEMENT STRATEGY

The strategy is described in different components of the transportation system. It is intended that the transportation system and services be seamless; that is, that they work together as one system, not individual disconnected pieces. The strategy also includes some policies related to and affecting transportation, but covering land development and other areas.

- Road system
  - Improve intersections to extent possible.
  - Maintain and regularly retime the traffic signal system to serve current traffic demands and patterns.
  - Complete gaps in the thoroughfare system before seeking new routes.
  - Develop detailed transportation management plans (multimodal) for major institutions and major event facilities to include normal peak period, special event and emergency conditions.
  - Provide high water access routes to TMC health care and critical support facilities.
  - Facilitate and prioritize transit operations where possible.
  - Improve freeway access to the area thoroughfares, especially to serve major traffic movements and the southeast portion of the study area.
  - Create and apply an access management policy to protect the available capacity of existing roads and enhance safety.

- IH-610 and SH 288 access to study area
  - Improve SH 288 – Southmore-Binz-MacGregor as part of Brays Bayou bridge replacement.
  - Improve SH 288 – Yellowstone-Old Spanish Trail-Holcombe ramps and intersections.
  - Improve SH 288 – Holly Hall as described above.
  - Add access between IH-610 and Almeda-Cambridge-Knight to provide east and west access and make Knight and Cambridge continuous across freeway.

- Improve IH-610 – Main to provide more capacity to/from west (direct connector ramp).

- Transit service
  - Provide direct service between major trip origins and destinations within and to/from major study area destinations.
  - Regularly monitor both demand and service and modify service as new developments are completed and travel patterns change.

- Pedestrian travel
  - Implement TMC master plan grade-separated sky bridge system joining areas north and south of Holcombe and connecting to LRT stations and bus stops.
  - Create a more pedestrian friendly environment:
    - sidewalks on all streets;
    - direct walkways between major destinations;
    - convenient, direct access to transit stops;
    - building entrances near streets and sidewalks;
    - safe pedestrian crossings;
    - grade separations at major crossings, especially between multi-story buildings; and
    - attractive pedestrian walkways with as few vehicle conflicts as possible.

- Bicycle travel
  - Provide grade separated commuter bike routes along Brays Bayou.
  - Where possible, provide direct commuting routes along the periphery or through Herman Park and along boulevards and utility corridors within and leading to the study area.

- Parking
  - Locate parking along or adjacent to thoroughfares.
  - Locate parking on peripheries of major developments rather than internally, but not obstructing direct and convenient pedestrian access to buildings.
  - Where parking cannot be provided on-site, remote parking should be located along major access routes and be directly served by shuttles; remote-parking facilities should be sufficiently large to permit frequent shuttle service to be feasible.

- Locate, design and manage valet parking so it does not congest access, self-parking, or adjacent sidewalks and streets.

- Land development
  - Develop more housing (at varying price levels) within and immediately adjacent to study area to improve localized job-work force balance and reduce long distance commuting.
  - Encourage site plans that promote walking rather than use of motor vehicles (e.g., parking behind buildings, small setbacks from street, etc.).
  - Ensure existing transportation access routes to critical facilities as well as important support facilities (e.g., emergency access, loading docks, physician parking) are above 100 year flood plain level.

- Other Policies
  - Take measures to reduce total and peak period vehicular travel demand (incentive, benefit based).

7. CONCLUSIONS

Other centers

- It was evident that there are a variety of types of centers. Some have a single developer and others have many developers.
- They also have varying approaches to transportation management and planning:
  - centralized and coordinated such as Las Colinas;
  - typical city area; and
  - area associations, transportation management organizations (TMO), and management districts.
- Many have area TDM programs.
- One has an internal people mover.
- Few have remote parking.
- Most have free parking for visitors, whereas some do charge for parking.
- Parking is generally provided as part of the individual developments. None have real area-wide parking policies.
- Most of the areas can secure their own funding to meet their immediate transportation needs.

Goals and objectives

- Where the goals and objectives do exist, they are fairly broad.
- The TMC area, therefore, should be able to comply with the broader goals and objectives.

Overall conclusions for the TMC

- The investigation of other major development areas showed some precedents that can be followed:
  - Consider area-wide coordinated plan or strategy;
  - Consider the following structures:
    - TMO, to oversee transportation planning and management for the whole study area;
    - Development district, to raise funds; and
    - TIRZ, to raise funds targeted for redevelopment areas;

  - Other activity areas within the study area to consider internal shuttles to reduce automobile travel.

APPENDIX

Additional Activity Center Information

1. University of Texas Southwestern Medical Center, Dallas,

Contact persons: Roger Marten (214) 648 2364 (shuttle service)
Joseph Mohammed (214) 648 8742 (supervisor)

Web address: http://www3.utsouthwestern.edu/

- There are 1,200 to 1,600 visitors a day
- The DART light rail circulates through Irving, Fort Worth, up to the airport, and downtown. It also has a stop at the Medical Center.
- People generally use E-Passes, which are good for both the train and buses. These passes are provided to employees at a very low cost.
- There are two shuttle bus routes from the train station at the medical center to two internal shuttle bus stops. One of the shuttle services is grade separated and operates on the elevated bridge. The service is provided for 12 hours a day.
- The students use the new student buses for transportation to and from the campus.
- There are both open parking lots and garages. Apart from a lack in parking garages, there is plenty of parking available.
- Each employee has a parking spot. A parking permit for a year can be as high as $1,000. There are a couple of visitor's parking lots, which cost around $3 a day.
- There has been a general increase in transit ridership of about 20-30%. This increase has been attributed to the light rail service and the most efficient shuttle service.
- Walking trails have been completed. There are now adequate trails around South Campus

2. University of Wisconsin Medical Center (Medical School)

Contact persons: David Gaarder (608) 262-1100

Web address: http://www.med.wisc.edu/

- The center has a clinical science center, teaching hospital, veterinary hospital, rehabilitation center, and a drug production facility. There are also plans to build a pharmacy school and some other facilities.
- There is a city bus system that has routes through the campus.
- For internal circulation there is a campus shuttle system as well as the Medical School's own shuttle system. Buses depart every 20 minutes to move people from one area in the campus to another.
- The average walking time is 20 minutes and by bus it takes around 5 minutes.

- The City buses and the internal campus buses are free of charge for all students (the University is and the federal government subsidize the passes). There are plans to make it free to all employees to encourage the use of public transit.
- There is a vanpool service for people living in outlaying communities.
- There are no major arterials crossing the Medical Center, making it very bicycle and pedestrian friendly.
- Many students use mopeds. People living in the so-called Bedroom Community use bicycles to commute to work.
- The community would like to have a railway system that would connect the hospital with the outlying community. This would, however, require billions of dollars and probably 20 years to make a reality.
- Most of people, however, use SOVs.
- There are tremendous parking shortages. The parking is infrastructure is in the form of a combination of multilevel garages and open lots.
- The general attitude is not to build more spaces. They realize that even if they build more, the demand would be so high that it still would not be enough.
- The price for parking doubled lately. There are some plans to double the size of the Veterans Administration Hospital. This will coincide with a doubling of its parking supply.
- There are so-called flex-lots. People commit to only use the lot a part of the time. The rest of the time the lot will be available for other users. This is accomplished by using a form in which you state how much you will be using the lot. It is another way to encourage people to use transit.
- There is one remote parking lot, which is about 4 miles outside the campus area. A shuttle service is provided but the facility is not popular at all.
- Parking is supposed to be self-financing. Some money is, however, used for maintaining other facilities. The fees for parking are also very low, on the order of $500 per year.

3. Research Triangle Park, Raleigh, NC

Contact persons: Liz Roks (919) 549 8181 (Planning and Development Department)
Crystal Bunch (919) 549 8181 (TDM Coordinator)

Web address: http://www.rtp.org/ (see Smart Commute at RTP)

- Total area is about 7,000 acres (8 miles by 2 miles)
- A total of 136 organizations are located in the Research Triangle Park (RTP) (of these, 106 are research and development oriented)
- An estimated 45,000 employees work in the Park. Including the contract employees, this number is over 50,000.
- Approximately 50% of the employees in the Park work for multinational corporations
- Almost 40% of Park employers have less than 10 employees
- The average salary of an RTP employee is about $54,000
- The uses in the Park are research, industrial, commercial (offices, banks), and service industries (one hotel), no residential

- There is a regional bus system, Triangle Transit Authority, which operates within the Park.
- Some companies have their own buses, especially when the company is situated on multiple campuses. These services involve shuttling employees from campus to campus, or from the regional transport facilities to the campuses.
- The internal transportation system is good, but leaving the Park results in the normal problems associated with congestion.
- There are 15 miles of the walking trails
- There is an extensive TDM program. They have a fulltime position of TDM coordinator. The responsibilities of this position include:
  - Attending all transportation related meetings in the community
  - Proposing TDM measures
  - Assisting organizations within the park to implement TDM measures
  - Meeting with corporate representatives to talk about ways to motivate their employees to participate in TDM programs
- According to 2001 data, 14% of employees are using something else than SOVs, including carpools, vanpools and telecommuting. The website suggests that this number is even higher at 27%. RTP performs annual surveys of employee travel patterns. The 2002 figures are not available yet. Link to Smart Commute figures: http://www.rtp.org/commute/tdm3.html
- The individual companies provide their own parking. They use lots and multilevel parking garages.

4. Las Colinas, Dallas/Irving

Contact persons: Katherine Lesser (972) 541-2345 (Office Manager)

Web address: http://www.lascolinasassn.com/

- Las Colinas is a 12,000 acre master planned development located within the City of Irving, Texas
- It comprises of a combination of commercial, residential, educational, recreational and, retail uses
- It has 960 acres of urban center (including developed and undeveloped areas)
- To date, there are about 4,000 residential units, represented by various communities, most of them gated. It also includes multifamily apartment buildings.
- The City of Irving bus system is used to assist with commuting into and out of the development.
- There is a limited grade-separated people mover system that operates between some of the major office buildings in the urban center. It functions very much like a shuttle service. The system was originally planned to form a loop through the completed urban center. This service operates during business hours; no fare is charged.
- Limited on-street parking is provided within the urban center.
- Larger buildings have their own indoor multilevel garages
- There are a number of remote parking lots located outside the urban center.

- In the case of special events (a tennis tournament was mentioned) special transportation is provided in the form of shuttles from the remote parking lots. Otherwise the remote parking lots are generally not used
- Parking in the commercial buildings is generally free of charge
- No overnight street parking is allowed within the gated communities

5. Hacienda Business Park, Pleasanton, California

Contact persons: James Paxson (925) 734-6510 (Urban Transportation Department)

Web address: http://www.hacienda.org/

- Total development size is 865 acres
- The uses comprise primarily of office, industrial (light manufacturing, bio-medical, food), residential (1500 units), retail, and warehouses
- The office component is 7 million sq. ft., whereas the retail component is about 1 million sq. ft.
- There are 18,500 employees and the residential population is around 4,000
- Hacienda has hubs for several transit agencies. There are two rail stops, both connected with the Bay Area Rapid Transit system.
- The Park shuttle system turned out to be very expensive to implement, so there was an agreement with the transit authority that its buses should pass through the development. Employees can ride for free; the service for the employees is subsidized.
- Hacienda Park's transportation department works closely with the Metropolitan Transportation Commission to increase ridesharing. Some of the recent figures include: carpooling—15 %, SUVs—70% (this number is decreasing), and buses—7%.
- The area is said to be very pedestrian friendly. There are also promotion programs for bicycling.
- Other TDM measures include a guaranteed ride home program and a commuter choice program (flex time).
- Parking is mostly provided in the form of open lots and is free of charge
- The requirement is for around 3 parking spaces per 1000 sq. ft. of office development. There is plenty of parking spaces (the requirement used to be 4 spaces per 1000 sq. ft.)
- No remote parking is provided
- There is a requirement to install preferential parking for carpools and vanpools. Approximately 5 % of the parking supply is used for this purpose.

6. Irvine Spectrum, Irvine, California

Contact persons: Blake Windle (949) 789-9180 (Director of Retail Operations)
Kelly Buskes (949) 727-4273 (Spectrum Transportation Management Association)

Web address: http://www.irvinespectrumcenter.com/

- Total development size is approximately 5,000 acres
- It was initiated in 1985 and was planned as a center for research, technology and business
- There are approximately 2,500 businesses and 55,000 employees
- The uses are commercial, shopping, office, and a very small residential component
- Destinations such as Los Angeles and San Diego are all reachable by freeway, bus or Metrolink (a commuter rail service that departs from the Irvine Transportation Center in Irvine Spectrum).
- The transit services consist of the county transit authority bus service and the regional commuter rail system.
- There are train stations and bus stations in the City of Irvine. No buses are operated by the Center itself
- Buses run throughout the city and throughout the Center
- A survey of 10,000 commuters reported that around 30 to 35 % of them are ridesharing or using transit. The breakdown is as follows: 25% carpooling, 5% vanpooling, 3 to 5% using buses, and 65% travel alone (SUVs).
- Parking is provided by employers and developers. Most of the parking is free and is provided in lots and garages.
- First time bus riders ride for free. Otherwise no specific programs exist to encourage using other modes of transportation

7. Bellevue, Washington

Contact persons: Paul Crochek (425) 452-2864 (Transportation Planning)
John Don (425) 452-4894 (TDM program coordinator)

Web address: http://www.ci.bellevue.wa.us/index.asp

- Bellevue is a suburban (downtown) business district in the center of the community. The size is about 400 acres
- There are 35,000 jobs and 3,000 households in the district.
- By 2020 it is expected to have grown to a total of 79,000 job opportunities and 10,000 households.
- The uses are commercial and retail, and some residential.
- The daily person trips to and from downtown are 252,000 at the moment. By 2020 it expected to have grown to 660,000
- Transit is provided by the County Transit Agency, around 38 bus routes circulate throughout the downtown
- There is a pedestrian corridor, running from east to west, throughout the downtown. It connects the Transit Center in downtown (where all bus routes connect) with the Shopping Center, which is also in downtown
- Private developers mostly own the parking lots. The generated revenue goes to the companies owning and operating these lots.
- Most of the parking infrastructure is garages.
- There are no remote parking lots, so no special transportation is required for this function

- The 2000 employee survey showed that 68% drive alone, 17% use carpools or vanpools, and 13% use transit, and 2% use other modes.

8. Crystal City, VA

Contact persons: Mr. Maslamka (703) 228 3694 (Public Works Department)
General information (410) 550 –0100

Web address: http://www.crystalcity.com
Link to Commuting in the area:
http://www.omniride.com/

- It is a mixed-use development comprising predominantly of office space. There are also some retail and residential components.
- The following rail systems feed Crystal City: i) DC Metro (heavy rail), with a stop in Crystal City; ii) Virginia Railway Express (commuter rail), with two lines going into Crystal City; iii) There are plans for having a light rail system going through Crystal City
- Several Metro bus routes terminate in or go through Crystal City. These include OmniRide network—buses that come from suburban areas to the south of Arlington; and the Fairfax connector—buses from western suburbs going to Crystal City.
- There is also a network of shuttles that run through Crystal City during peak hours. These shuttles pick up the passengers at the various buildings and transport them to different areas in Crystal City.
- There is a Commuter Store at Crystal City, which provides information to encourage people to use alternative modes of transportation. Carpooling and vanpooling are reported to be popular.
- Crystal City is built in the radiant style, office buildings are built on large parking structures.
- The parking structures are exclusive for the buildings that they serve. Most of the offices and building belong to one company (Charles Smith). The generated parking revenue goes to this company.
- There is a plan to make changes to the parking facilities and to relocate spaces closer to the retail facilities.

9. Uptown Houston, Houston, Texas

Contact persons: John Breeding (713) 621-2011 (President)

Web address: http://www.uptown-houston.com/default.html

- Total development size is approximately 350 acres.
- It comprises approximately 23.6 million square feet of office space and 5 million square feet of retail space.

- The development is home to more than 2,000 businesses, 600 retail stores, 100 restaurants, 26 hotels, and a residential area of 1,819 single family homes and 4,946 multifamily units
- More than 200,000 office workers and shoppers visit the area on a daily basis. This results in more than 18 million visitors each year.
- There are serious accessibility problems because the secondary street network is very poor and the primary network is overused.
- Some committed and planned projects will help to alleviate some of the congestion problems. These projects include West Loop reconstruction, Katy Freeway reconstruction, new Westpark toll road construction, and $235,000,000 million worth of local street improvements and very limited transit improvements.
- They have just received a grant to operate a shuttle service to assist with internal circulation.
- There is extensive structured parking (around 80,000 spaces) and some surface parking for retail and other small businesses.
- Office parking is charged as an itemized portion of lease expenses. The leaseholder pays the owner so that the employees do not have to pay directly.
- METRO is conducting a Major Investment Study to determine the type of long-term transit improvements that are required (LRT, BRT, etc.)
- Uptown Houston has a management district and a TIRZ to assist in funding infrastructure improvements and some services that benefit the area. Some road improvements are being funded through these methods.

10. Warner Center, San Fernando Valley, California

Contact persons: Chris Park (818) 596-6290 Executive Director

Web address: http://www.warnercenterprop.com/

- Warner Center Properties is the largest office complex in the San Fernando Valley.
- The development is located on a square mile area and includes a 50-acre office and R&D campus, which offers 2.3 million square feet of space. In addition there are also retail shops, light manufacturing, residential, and an entertainment area.
- There are 40,000 employees, of which approximately 5,000 live within the legal boundaries of Warner Center.
- Warner Center is situated close to major freeway. There is a good road network but with some congestion problems.
- Transit is limited, as Warner Center is situated in the suburbs
- There are 6 transit agencies that provide bus services in the Center. There are plans to expand this network. The Warner Center Transportation Management encourages government to improve traffic in the center, so that some lines are rerouted to the center.
- There is the mid-lunch time shuttle circulator, which takes office workers to food courts within the Center.
- There is currently no rail connection for the Center.

- They have plans to implement a Separate Path Busway project. This is a separate exclusive path for special buses, which will be hooked up with the LA subway system.
- There are safe sidewalks for fairly safe pedestrian activities. Bike lanes, however, are very limited.
- There are a variety of different property owners in Warner Center. The majority of companies own their own surface lots. Most of these lots (60-70 %) are free of charge.
- There is a parking policy that allows preferential parking for carpools.
- The mode split according to 2001 data is as follows: 68%--travel alone, 23%--use carpools, 5%--use buses (this figure increased a lot during a couple of years), 2%--walk and bike, 1%--us vanpools, 1%--use telecommuting & compressed work week.
- Sometimes the companies negotiate discounted bus passes for their employees. In general they provide incentives for using carpooling and vanpooling.